

Conference Abstract

Enhancing Monitoring and Control of the Fall Armyworm (*Spodoptera frugiperda*) in the Democratic Republic of the Congo (DR Congo) by Citizen Science.

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Abstract

The Fall Armyworm (FAW) (*Spodoptera frugiperda* - Lepidoptera) is an insect that feeds on more than 80 plant species and causes major damage to economically important crops including maize, rice or sugarcane. While in cooler climates development slows down to one or a few generations per year because frost kills the insect, in Africa, the FAW moths can travel hundreds of kilometers per night and reproduce every 1–2 months, which helped the pest spread rapidly. Environmental and climatic analyses of Africa show that the FAW is likely to build permanent and significant populations in West and Southern Africa, spreading to other regions when weather or temperatures are favourable.

Located in the Central Africa, the DR Congo is now facing this challenge. Since 2016, the FAW has caused important yield losses (up to 80% in 4 regions) where maize is cultivated. Almost 50 of the 147 administrative territories have been affected. The damage resulted in a surge in commodity prices (the price of a 25 kg bag of corn rose from \$ 10 to \$ 30).

Pesticides and genetically modified (GM) crops could be the main methods of control but many farmers in the DR Congo do not yet plant GM crops. Biopesticides (including virus-based and *Bacillus thuringiensis*), mass rearing and release of parasitoids and predators are low-risk options, but remain prohibitive to many small-scale farmers; subsidies or government-funded interventions are unavailable.

In all cases, further research is needed across the country, through national and regional institutes, to understand the insect's lifecycle stages and feeding habits. A widespread communications programme is necessary to teach farmers how to monitor and identify the pest. There is a clear need for information resources about FAW, which can help inform and keep all interested parties up-to-date on the latest news regarding spread, management research, diagnostic protocols for monitoring and early detection techniques of FAW.

However, faced with a political will shifted to other priorities, no formal program to collect data to characterize this pest has been initiated and studies that provided current data are facing the following main challenges: (i) the national territory is too vast (more than 2,345,000 km²) and impossible to cover by these types of studies, (ii) insects are known under several common names (complicated by >240 languages) or only one name is used to identify taxonomically distant species; (iii) historical data are very hard to find (the oral tradition being preferred to writing); (iv) the absence of reference collections and the lack of specialists; (v) the difficulty of finding geo-referenced data (with the risk associated in its collection).

An effective alternative to circumvent these difficulties and to gather data is promoting citizen science. Such research programs involving scientists and the participation of amateurs or interested volunteer citizens within local populations would constitute a set of data across the country and over a longer period than what has been done so far. With the development of free software and mobile applications, non-specialists could, based on standards and protocols validated by scientists, be involved in the digitization of specimens observed or identification of insect species through graphical user interfaces; help clarify the correspondence between vernacular names and scientific names; participate in habitat monitoring of insect species; or help collecting geo-referenced data via mobile phone. These field-based research activities can be conducted without great expense and will offer professionals and non-professionals a collaborative ground to contribute together toward advances in monitoring and knowledge of FAW (and many other pests) in the DR Congo.

Keywords

Maize, FAW, pest, Citizen science, monitoring, control

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